

The product described herein has not been fully tested to ensure conformance to the requirements outlined below. TE Connectivity makes no representation or warranty, express or implied, that the product will comply with these requirements. Further, TE may change these requirements based on the results of additional testing and evaluation. Contact TE Engineering for further details.

Design Objective (108-115188)

1.5mm Pitch Double Row WTB with Latch

1. Scope:

1.1 Contents:

This specification covers the requirements for product performance, test methods and quality assurance provisions of 1.5mm Pitch Double Row Wire to Board Connector with Latch

Applicable product description and part numbers are as shown in Fig.1.

2. Applicable Documents

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements this specification and referenced documents, this specification shall take precedence.

2.1 AMP Specifications:

A. 109-5000 Test Specification, General Requirements for Test Methods

B. 501-115203 Test Report

2.2 Commercial Standards and Specifications:


A. EIA-364: Test Methods for Electronic and Electrical Component Parts.

(Always use latest version for test)

The application product descriptions and part numbers are as shown in Fig. 1


THIS INFORMATION IS CONFIDENTIAL AND IS DISCLOSED TO YOU ON CONDITION THAT NO FURTHER DISCLOSURE IS MADE BY YOU TO OTHER THAN AMP PERSONNEL WITHOUT WRITTEN AUTHORIZATION FROM AMP SHANGHAI LTD

DIST

A	INITIAL RELEASED	T.Q	1 ST Dec 20	DR Tommy Qian 1 st April' 19		<div>TE Connectivity</div>			
				CHK Wenke He 1 st April' 19					
				APP Wenke He 1 st April' 19		NO 108-115188		REV A	LOC ES
				PAGE 1 of 16		TITLE 1.5mm Pitch D/R Wire to Board Connector			
LTR	REVISION RECORD	DR	DATE						

Product Part No.	Description
2394528-1	Cable Housing of 1.5mm Pitch 10Pos WTB with Latch
2394528-2	Cable Housing of 1.5mm Pitch 20Pos WTB with Latch
2394528-3	Cable Housing of 1.5mm Pitch 30Pos WTB with Latch
2380403-1	ST type Tin PL Cable Contact of 1.5mm Pitch WTB with Latch
2380403-2	ST type Au Flash Cable Contact of 1.5mm Pitch WTB with Latch
2380403-3	HP type Tin PL Cable Contact of 1.5mm Pitch WTB with Latch
2380403-4	HP type Au Flash Cable Contact of 1.5mm Pitch WTB with Latch
2394521-1	R/A HP Type Au Flash Board Side of 1.5mm Pitch 10Pos WTB with Latch Natural
2394521-2	R/A HP Type Au Flash Board Side of 1.5mm Pitch 20Pos WTB with Latch Natural
2394521-3	R/A HP Type Au Flash Board Side of 1.5mm Pitch 30Pos WTB with Latch Natural
1-2394521-1	R/A HP Type Tin PL Board Side of 1.5mm Pitch 10Pos WTB with Latch Natural
1-2394521-2	R/A HP Type Tin PL Board Side of 1.5mm Pitch 20Pos WTB with Latch Natural
1-2394521-3	R/A HP Type Tin PL Board Side of 1.5mm Pitch 30Pos WTB with Latch Natural
2-2394521-1	R/A HP Type Au Flash Board Side of 1.5mm Pitch 10Pos WTB with Latch Black
2-2394521-2	R/A HP Type Au Flash Board Side of 1.5mm Pitch 20Pos WTB with Latch Black
2-2394521-3	R/A HP Type Au Flash Board Side of 1.5mm Pitch 30Pos WTB with Latch Black
3-2394521-1	R/A HP Type Tin PL Board Side of 1.5mm Pitch 10Pos WTB with Latch Black
3-2394521-2	R/A HP Type Tin PL Board Side of 1.5mm Pitch 20Pos WTB with Latch Black
3-2394521-3	R/A HP Type Tin PL Board Side of 1.5mm Pitch 30Pos WTB with Latch Black
4-2394521-1	R/A ST Type Au Flash Board Side of 1.5mm Pitch 10Pos WTB with Latch Natural
4-2394521-2	R/A ST Type Au Flash Board Side of 1.5mm Pitch 20Pos WTB with Latch Natural
4-2394521-3	R/A ST Type Au Flash Board Side of 1.5mm Pitch 30Pos WTB with Latch Natural
5-2394521-1	R/A ST Type Tin PL Board Side of 1.5mm Pitch 10Pos WTB with Latch Natural
5-2394521-2	R/A ST Type Tin PL Board Side of 1.5mm Pitch 20Pos WTB with Latch Natural
5-2394521-3	R/A ST Type Tin PL Board Side of 1.5mm Pitch 30Pos WTB with Latch Natural
6-2394521-1	R/A ST Type Au Flash Board Side of 1.5mm Pitch 10Pos WTB with Latch Black
6-2394521-2	R/A ST Type Au Flash Board Side of 1.5mm Pitch 20Pos WTB with Latch Black
6-2394521-3	R/A ST Type Au Flash Board Side of 1.5mm Pitch 30Pos WTB with Latch Black
7-2394521-1	R/A ST Type Tin PL Board Side of 1.5mm Pitch 10Pos WTB with Latch Black
7-2394521-2	R/A ST Type Tin PL Board Side of 1.5mm Pitch 20Pos WTB with Latch Black
7-2394521-3	R/A ST Type Tin PL Board Side of 1.5mm Pitch 30Pos WTB with Latch Black

Fig. 1 (to be continue)

	TE Connectivity	PAGE 2	NO 108-115188	REV A	LOC ES
---	------------------------	-------------------------	-------------------------	-----------------	------------------

Product Part No.	Description
2394520-1	Vertical HP Type Au Flash Board Side of 1.5mm Pitch 10Pos WTB with Latch Natural
2394520-2	Vertical HP Type Au Flash Board Side of 1.5mm Pitch 20Pos WTB with Latch Natural
2394520-3	Vertical HP Type Au Flash Board Side of 1.5mm Pitch 30Pos WTB with Latch Natural
1-2394520-1	Vertical HP Type Tin PL Board Side of 1.5mm Pitch 10Pos WTB with Latch Natural
1-2394520-2	Vertical HP Type Tin PL Board Side of 1.5mm Pitch 20Pos WTB with Latch Natural
1-2394520-3	Vertical HP Type Tin PL Board Side of 1.5mm Pitch 30Pos WTB with Latch Natural
2-2394520-1	Vertical HP Type Au Flash Board Side of 1.5mm Pitch 10Pos WTB with Latch Black
2-2394520-2	Vertical HP Type Au Flash Board Side of 1.5mm Pitch 20Pos WTB with Latch Black
2-2394520-3	Vertical HP Type Au Flash Board Side of 1.5mm Pitch 30Pos WTB with Latch Black
3-2394520-1	Vertical HP Type Tin PL Board Side of 1.5mm Pitch 10Pos WTB with Latch Black
3-2394520-2	Vertical HP Type Tin PL Board Side of 1.5mm Pitch 20Pos WTB with Latch Black
3-2394520-3	Vertical HP Type Tin PL Board Side of 1.5mm Pitch 30Pos WTB with Latch Black
4-2394520-1	Vertical ST Type Au Flash Board Side of 1.5mm Pitch 10Pos WTB with Latch Natural
4-2394520-2	Vertical ST Type Au Flash Board Side of 1.5mm Pitch 20Pos WTB with Latch Natural
4-2394520-3	Vertical ST Type Au Flash Board Side of 1.5mm Pitch 30Pos WTB with Latch Natural
5-2394520-1	Vertical ST Type Tin PL Board Side of 1.5mm Pitch 10Pos WTB with Latch Natural
5-2394520-2	Vertical ST Type Tin PL Board Side of 1.5mm Pitch 20Pos WTB with Latch Natural
5-2394520-3	Vertical ST Type Tin PL Board Side of 1.5mm Pitch 30Pos WTB with Latch Natural
6-2394520-1	Vertical ST Type Au Flash Board Side of 1.5mm Pitch 10Pos WTB with Latch Black
6-2394520-2	Vertical ST Type Au Flash Board Side of 1.5mm Pitch 20Pos WTB with Latch Black
6-2394520-3	Vertical ST Type Au Flash Board Side of 1.5mm Pitch 30Pos WTB with Latch Black
7-2394520-1	Vertical ST Type Tin PL Board Side of 1.5mm Pitch 10Pos WTB with Latch Black
7-2394520-2	Vertical ST Type Tin PL Board Side of 1.5mm Pitch 20Pos WTB with Latch Black
7-2394520-3	Vertical ST Type Tin PL Board Side of 1.5mm Pitch 30Pos WTB with Latch Black

Fig. 1 (End)

3. Requirements:

3.1 Design and Construction:

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

3.2 Materials:

A. Board side:

Contacts: Gold plating or Tin plating, Copper Alloy

Housing: LCP, UL94V-0, Natural or Black

Metal Peg: Tin plating, Copper Alloy

B. Cable side:

Contacts: Gold plating or Tin plating, Copper Alloy

Housing: Nylon, UL94V-0, Natural or Black

3.3 Ratings:

A. Voltage Rating: 50 Volts AC (per pin)

B. Current Rating (Maximum)

AWG # 24: 3.0 A (per pin) *1

AWG # 24: 2.0 A (per pin) *2

AWG # 26: 2.0 A (per pin)

AWG # 28: 1.5 A (per pin)

AWG # 30: 1.0 A (per pin)

*1: For HP Type

*2: For ST Type

C. Temperature Rating: -40°C to +105°C

The upper limit of the temperature includes the temperature rising resulted by the energized electrical current.



TE Connectivity

PAGE
4

NO
108-115188

REV	LOC
A	ES


3.4 Performance Requirements and Test Descriptions:

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Fig.2. All tests shall be performed in the room temperature unless otherwise specified.

3.5 Test Requirements and Procedures Summary:

Para.	Test Items	Requirements	Procedures
3.6.1	Examination of product	Product shall be confirming to the requirements of applicable product drawing and applicable Specification	Visual and Dimensional Inspection Test Procedure for Electrical Connectors. EIA-364-18
Electrical Requirements			
3.6.2	Termination Resistance (Low Level)	20 mΩ Max. (Initial) ΔR<10 mΩ (Final)	Subject mated contacts assembled in housing to 20mV Max. open circuit at 10 mA. EIA-364-23
3.6.3	Dielectric withstanding voltage	No creeping discharge or flashover shall occur. Current leakage: 1mA Max.	500 VAC Min. at sea level for 1 minute Test between adjacent contacts of unmated connectors. (EIA-364-20)
3.6.4	Insulation Resistance	1000 MΩ Min	Unmated connectors, apply 500 V DC between adjacent terminals. (EIA-364-21)
3.6.5	Temperature Rising	30°C max, when apply current rate	Mate connector: measure the temperature rise at rated current until temperature stable. The ambient condition is still air at 25°C (EIA-364-70 METHOD 2)

Fig.2. To be continued

	TE Connectivity	PAGE 5	NO 108-115188	REV A	LOC ES
---	-----------------	-----------	------------------	----------	-----------

Para.	Test items	Requirements	Procedures
Mechanical Requirements			
3.6.6	Connector Mating/Unmating Force	See Table 5	<p>Operation Speed : 25.4 ± 3 mm/minute..</p> <p>Measure the force required to mate/unmated connector.</p> <p>Unmated connector angle θ is +/-20 degree max. See figure 1 (EIA-364-13)</p>
3.6.7	Durability (Repeated Mate/Unmating)	30 cycles	<p>The sample should be mounted in the tester and fully mated and unmated the number of cycles specified at the rate of 25.4 ± 3mm/min. (EIA-364-09)</p>
3.6.8	Vibration (Low Frequency)	1 us Max.	<p>The electrical load condition shall be 100 mA maximum for all contacts. Subject to a simple harmonic motion having amplitude of 0.76mm (1.52mm maximum total excursion) in frequency between the limits of 10 and 55 Hz. The entire frequency range, from 10 to 55 Hz and return to 10 Hz, shall be traversed in approximately 1 minute. This motion shall be applied for 2 hours in each of three mutually perpendicular directions. (EIA-364-28 Condition I)</p>
3.6.9	Physical Shock	1 us Max.	<p>Subject mated connectors to 50 G's (peak value) half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen (18 shocks). The electrical load condition shall be 100mA maximum for all contacts. (EIA-364-27, test condition A)</p>
3.6.10	Contact Retention Force of Board side	0.40 kgf Min.	<p>Operation Speed : 25.4 ± 3 mm/minute.</p> <p>Measure the contact retention force with Tensile strength tester.</p>
3.6.11	crimping Terminal Pull Strength of the housing (Cable size)	0.50 kgf Min.	<p>Operation Speed : 25.4 ± 3 mm/minute.</p> <p>Measure the Terminal retention force with Tensile strength tester.</p>



TE Connectivity

PAGE
6

NO
108-115188

REV
A

LOC
ES


3.6.12	Wire Crimping Strength	AWG# 24: 2.5Kgf Min AWG# 26: 2.0Kgf Min AWG# 28: 1.0Kgf Min AWG# 30: 0.5Kgf Min.	Pull wire axially from at the speed rate of 25.4 ± 3 mm/min.
3.6.13	Board Lock Pull Strength of Wire Lock	1.0kgf Min.	Operation Speed : 25.4 ± 3 mm/minute. Measure the Board Lock Pull Strength of Wire Lock.

Fig. 2 (To be continued)

Para	Test Items	Requirements	Procedures
Environmental Requirements			
3.6.14	Thermal Shock	See Product Qualification and Test Sequence Group 4	Mate module and subject to follow condition for 5 cycles. 1 cycles: -40 +0/-3 °C, 30 minutes +85 +3/-0 °C, 30 minutes (EIA-364-32, test condition A)
3.6.15	Humidity	See Product Qualification and Test Sequence Group 4	Mated Connector 40°C , 90~95% RH, 96 hours . (EIA-364-31, Condition A, Method II)
3.6.16	Salt Spray (Only for GOLD)	See Product Qualification and Test Sequence Group 12	Subject mated/unmated connectors to 5% salt-solution concentration, 35°C for 24 hours . (EIA-364-26, Test condition B)
3.6.17	Temperature Life (Heat Aging)	See Product Qualification and Test Sequence Group 5	Subject mated connectors to temperature life at 105°C for 96 hours . (EIA-364-17, Test condition A)
3.6.18	Solderability	Solder able area shall have minimum of 95% solder coverage.	Subject the test area of contacts into the flux for 5-10 sec. And then into solder bath, Temperature at 245 ±5°C , for 4-5 sec . (EIA-364-52)
3.6.19	Resistance to Reflow Soldering Heat	See Product Qualification and Test Sequence Group 6 (Lead Free)	Pre Heat : 150°C~180°C , 60~120sec. Heat : 230°C Min. , 40sec Min. Peak Temp. : 260°C Max , 10sec Max.

Note. Flowing Mixed Gas shall be conduct by customer request.

Fig. 2 (End)

	TE Connectivity	PAGE 8	NO 108-115188	REV A	LOC ES
---	-----------------	-----------	------------------	----------	-----------

4. PRODUCT QUALIFICATION AND TEST SEQUENCE

Test or Examination	Test Group											
	1	2	3	4	5	6	7	8	9	10	11	12
	Test Sequence											
Examination of Product				1,7	1,6	1,4						1,4
Low Level Contact Resistance		1,5	1,4	2,10	2,9	2,5						2,5
Insulation Resistance				3,9	3,8							
Dielectric Withstanding Voltage				4,8	4,7							
Temperature rise	1											
Mating / Unmating Forces		2,4										
Durability		3										
Contact Retention Force (Board Side)								1				
Vibration			2									
Shock (Mechanical)			3									
Thermal Shock				5								
Humidity				6								
Temperature life					5							
Salt Spray												3
Crimping Terminal Pull Strength of the housing (Cable size)									1			
Board Lock Pull Strength of Wire Lock										1		
Wire Crimping Strength											1	
Solder ability							1					
Resistance to Soldering Heat						3						

Numbers indicate sequence in which the tests are performed.



TE Connectivity

PAGE
9

NO
108-115188

REV
A
LOC
ES

5. Mating / Unmating Force:

Unit: N

Pos. No.	At initial		At 30th
	Mating Force. (Max)	Unmating Force (Min)	Unmating Force (Min)
10	40	4	4
20	70	7	7
30	80	8	8

Table 5

6. INFRARED REFLOW CONDITION

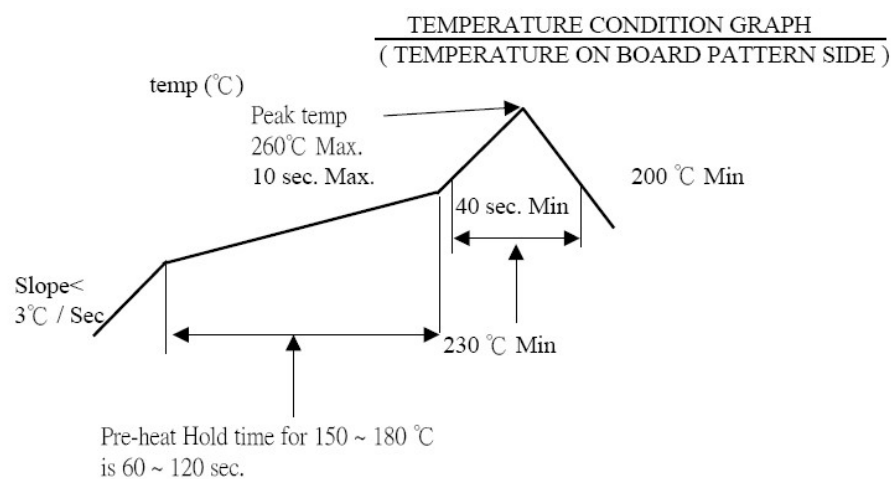


Fig. 6



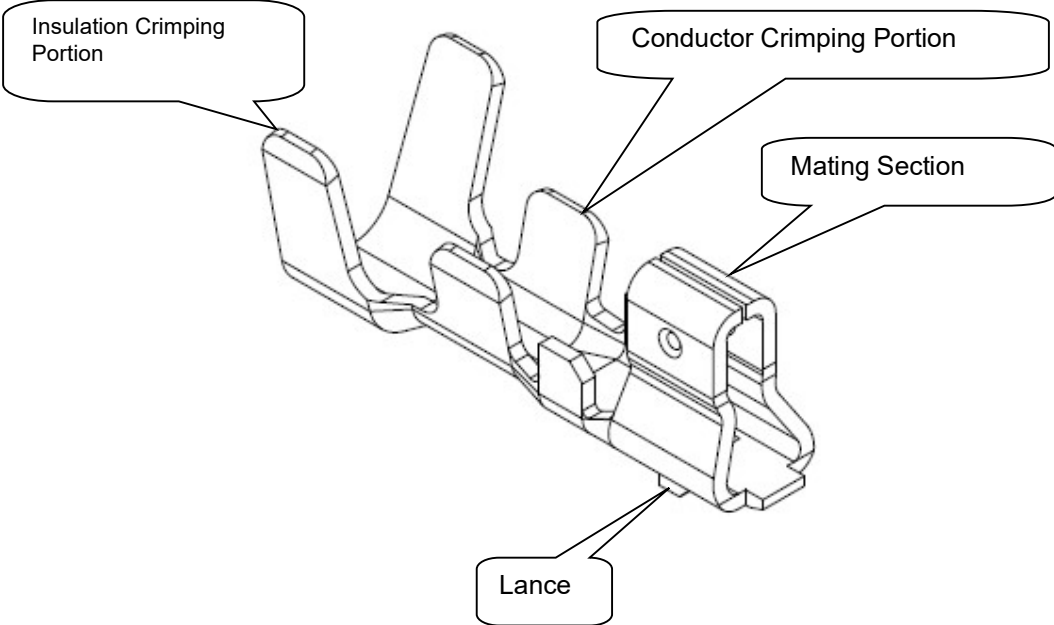
TE Connectivity

PAGE
10

NO
108-115188

REV	LOC
A	ES

7. ANATOMY OF CRIMPING TERMINAL



8. APPLICABLE WIRES: UL10584 ETFE WIRE

AWG Size:AWG#30~#24

Insulation OD: $\Phi 0.70 \sim 1.00 \text{mm}$



TE Connectivity

PAGE
11

NO

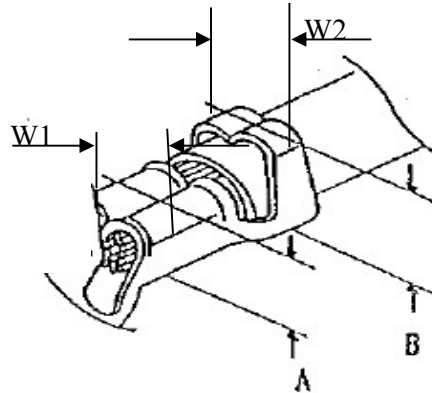
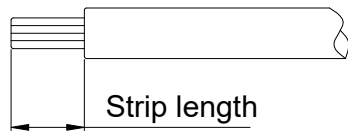
108-115188

REV
A

LOC
ES

9. CRIMPING CONDITION

CRIMPING CONDITION							
Part Number	Wire Specification			Crimp Height (mm)		Crimp Width (mm)	
	UL Style (REF.)	AWG Size	Insulation OD(mm)	Conductor A	Insulation B	Conductor W1	Insulation W2
2380403-*	UL1061	24	1.10	0.52~0.58	1.57~1.63	0.90(Ref)	1.05 max.
	UL1061	26	1.00	0.52~0.58	1.47~1.53	0.80(Ref.)	1.05 max.
	UL1061	28	0.90	0.52~0.58	1.37~1.43	0.70(Ref.)	1.05 max.
	UL1061	30	0.70	0.52~0.58	1.25~1.31	0.60(Ref.)	1.05 max.



Note:

- 1、W1: Conductor Crimping Width
- 2、W2: Insulation Crimping Width
- 3、A: Conductor Crimping height
- 4、B: Insulation Crimping height
- 5、Strip length : 1.2~1.6mm



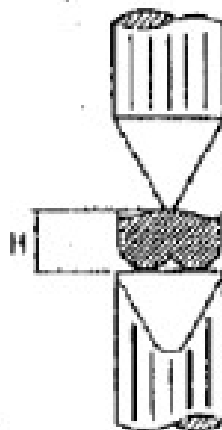
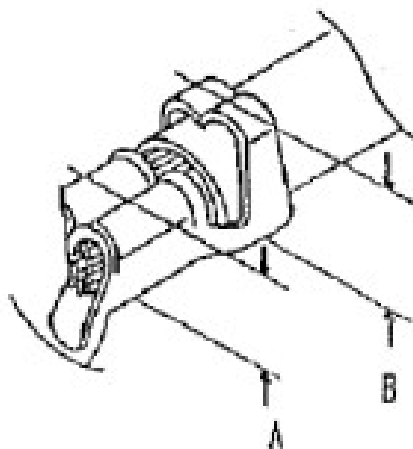
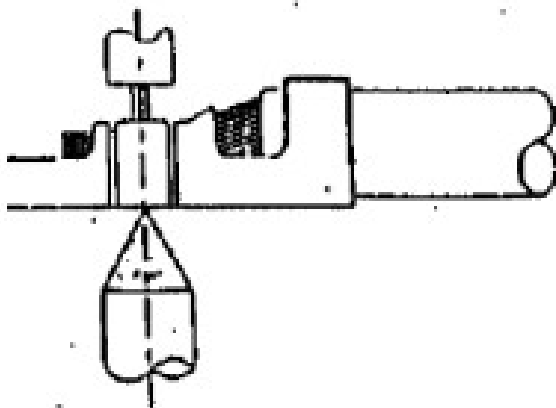
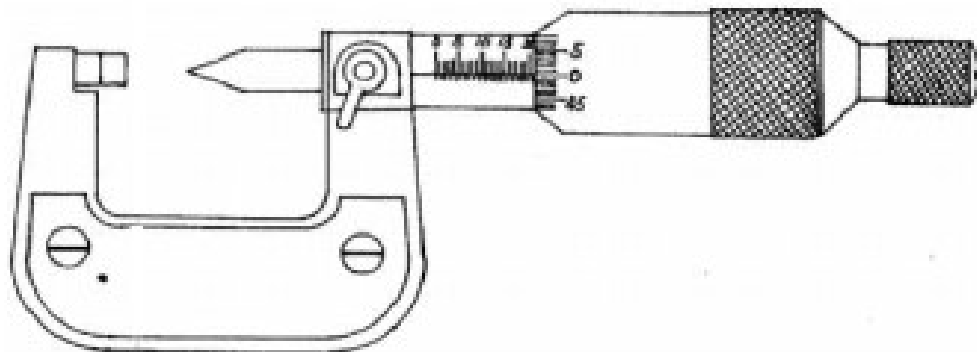
TE Connectivity

PAGE
12

NO
108-115188

REV
A LOC
ES

10. CRIMPING HEIGHT MEASUREMENT



TE Connectivity

PAGE
13

NO
108-115188

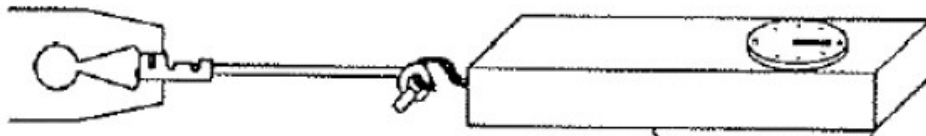
REV
A

LOC
ES

11. PULL FORCE OF CRIMPING SECTION MEASUREMENT

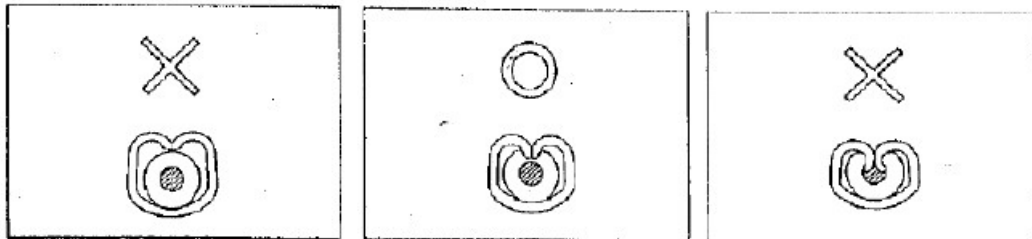


Before test samples, please measure crimp height and do not crimp insulation.



Pull Force of Crimp Section Measurement

12. STANDARD INSULATION CRIMPING



Not enough crimp

Good

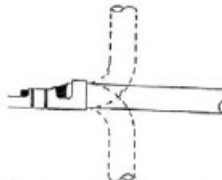
Crimp too much



Good

NG

Insulation Crimp Condition



As following figure shown.
It is no problem if wire bent
up down 90 degrees 1 cycle
and insulation position still
in ideal position.



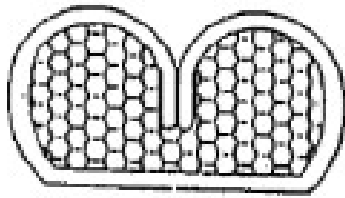
TE Connectivity

PAGE
14

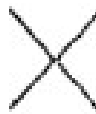
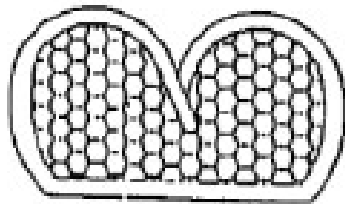
NO
108-115188

REV
A
LOC
ES

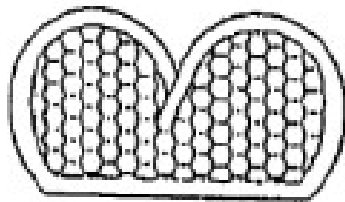
13. CONDUCTORS CRIMPING CONDITION



Good

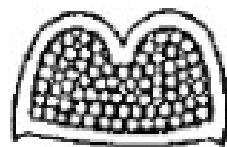


NG

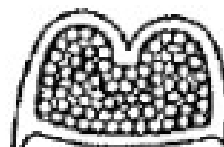


NG

Lower conduct
retension force



Good



Large burr

NG



TE Connectivity

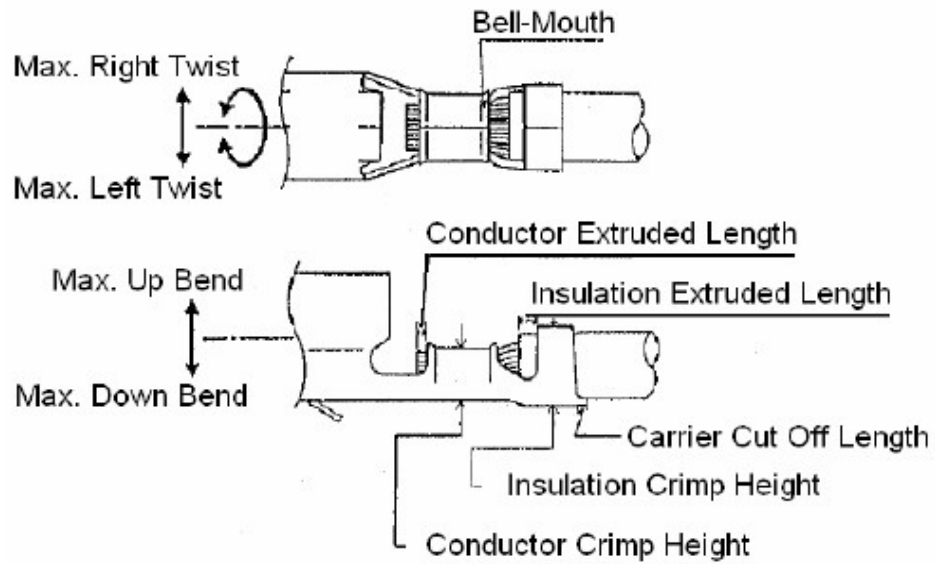
PAGE
15

NO
108-115188

REV
A

LOC
ES

14 CRIMPING REQUIREMENTS



Item	Range(Ref.)
Max. Up Bend	6°
Max. Down Bend	6°
Max. Left Twist	5°
Max. Right Twist	5°
Bell-Mouth Length	0.1~0.3mm
Carrier Cut Off Length	0~0.2mm
Conductor Extruded Length	0.1~0.3mm



TE Connectivity

PAGE
16

NO
108-115188

REV
A
LOC
ES